

R E M A R K S

Careful review and examination of the subject application are noted and appreciated.

The present invention concerns an integrated circuit comprising a test circuit that may be configured to generate a test signal having a predetermined pulse width in response to a control input. The test signal generally tracks process corners of the integrated circuit and may be used to predict a failure of the integrated circuit.

SUPPORT FOR THE CLAIM AMENDMENTS

Support for the amendments to the claims can be found (i) in the drawings as originally filed, for example, on FIGS. 1-3 and 15, and (ii) in the specification as originally filed, for example, on page 1, lines 10-19, on page 7, line 19 through page 8, line 11 and on page 9, lines 3-16. As such, no new matter has been added.

CLAIM REJECTIONS UNDER 35 U.S.C. §112

The rejection of claim 24 under 35 U.S.C. §112, second paragraph, has been obviated by appropriate amendment and should be withdrawn.

The position taken on page 7, line 11-15 of the Office Action that "If the test signal is being used to predict the failure, then the failure must depend on the test signal" is not

persuasive. In particular, assuming, arguendo, if no test signal were generated, no failure could be predicted (as suggested on page 7, lines 14-15 of the Office Action and for which Applicants' representative does not necessarily agree), the Office Action fails to show why simply because a failure is not predicted, the failure can not still occur.

Contrary to the position taken in the Office Action, one skilled in the art would understand that because the internal control signal, as presently claimed, has a pulse width determined, in part, by a predetermined pulse width correlating with a probability of a physical failure in said integrated circuit occurring at a future time, the internal control signal may be used to predict the physical failure without the physical failure being dependant upon the internal control signal. Therefore, one skilled in the art would be able to reasonably ascertain the metes and bounds of the claim when read in light of the specification. However, claim 24 has been amended for consistency. As such, the rejection should be withdrawn.

CLAIM REJECTIONS UNDER 35 U.S.C. §102

The rejection of claim 11 under 35 U.S.C. §102 as being anticipated by Malek-Khosravi et al. '161 (hereinafter Malek-Khosravi) has been obviated by appropriate amendment and should be withdrawn.

Malek-Khosravi is directed to a minimum pulse width test module on a clocked logic integrated circuit (Title).

In contrast, the presently claimed invention (claim 11) provides an integrated circuit comprising means for generating an internal control signal in response to a first control input, wherein (a) the internal control signal has (i) a first pulse width when in a test mode and (ii) a second pulse width when not in the test mode, (b) the first pulse width is determined in response to one or more process corners and a predetermined pulse width correlating with a probability of a physical failure in the integrated circuit occurring at a future time and (c) the second pulse width is determined in response to the first control input. Malek-Khosravi does not disclose or suggest each and every element of the presently claimed invention, arranged as in the present claims. As such, the presently claimed invention is fully patentable over Malek-Khosravi and the rejection should be withdrawn.

The application of a prior art reference to a means or step plus function limitation requires that the prior art element perform the identical function specified in the claim (MPEP §2182). Malek-Khosravi does not perform an identical function to the presently claimed invention. Specifically, the presently claimed invention provides a means for generating an internal control signal having a first pulse width when in a test mode and a second

pulse width when not in a test mode, where the first pulse width is determined in response to one or more process corners and a predetermined pulse width correlating with a probability of a physical failure in the integrated circuit occurring at a future time.

In contrast, Malek-Khosravi generates sequences of variable width clock pulses in which each successive pulse is automatically increased or decreased in width (see column 2, lines 18-20 of Malek-Khosravi). Malek-Khosravi appears silent regarding a predetermined pulse width correlating with a probability of a physical failure in the integrated circuit occurring at a future time. Furthermore, Malek-Khosravi states that merely generating pulses of a simple width would not solve the problem which is solved by the invention of Malek-Khosravi (see column 1, lines 36-40 of Malek-Khosravi). Since Malek-Khosravi is silent regarding a predetermined pulse width correlating with a probability of a physical failure in the integrated circuit occurring at a future time and teaches that generating simple pulses of a single width is a problem and generating a sequence of pulses of variable width is the solution, it follows that Malek-Khosravi does not teach the identical function of generating an internal control signal having a first pulse width when in a test mode and a second pulse width when not in a test mode, where the first pulse width is determined in response to one or more process corners and a predetermined

pulse width correlating with a probability of a physical failure in the integrated circuit occurring at a future time, as presently claimed. Therefore, because Malek-Khosravi does not perform the identical function specified in the presently pending claim 11, the presently pending claim 11 is fully patentable over Malek-Khosravi and the rejection should be withdrawn.

CLAIM REJECTIONS UNDER 35 U.S.C. §103.

The rejection of claims 1-10 and 12-23 under 35 U.S.C. §103 as being unpatentable over Ahmad et al. (hereinafter Ahmad) in view of Malek-Khosravi has been obviated by appropriate amendment and should be withdrawn.

Ahmad is directed to a semiconductor array having a built-in test circuit for wafer level testing (Title). Malek-Khosravi is directed to a minimum pulse width test module on a clocked logic integrated circuit (Title).

In contrast to the cited references, the present invention (claim 1) provides an integrated circuit comprising a test circuit configured to generate an internal control signal in response to a control input, wherein (a) the internal control signal has (i) a first pulse width when a test mode is enabled and (ii) a second pulse width when the test mode is not enabled, (b) the first pulse width is determined in response to one or more process corners and a predetermined pulse width correlating with a



probability of a physical failure of the integrated circuit occurring at a future time and (c) the second pulse width is determined in response to the first control input. Claims 11 and 12 include similar recitations. Ahmad and Malek-Khosravi, alone or in combination, do not teach or suggest each and every element of the presently claimed invention. As such, the presently claimed invention is fully patentable over the cited reference and the rejection should be withdrawn.

The Office Action admits that Ahmad "does not expressly disclose a test signal having a predetermined pulse width in response to a control input, wherein said test signal tracks process corners and which can be used to predict failure of said integrated circuit" (see page 3, lines 15-18 of the Office Action, emphasis added). Furthermore, despite the position taken on page 3, lines 19-24 of the Office Action, Malek-Khosravi does not teach or suggest a circuit configured to generate an internal control signal having a first pulse width when in a test mode and a second pulse width when not in the test mode, where the first pulse width is determined in response to one or more process corners and a predetermined pulse width correlating with a probability of a physical failure in the integrated circuit occurring at a future time, as presently claimed.

In particular, Malek-Khosravi teaches generation of a sequence of pulses having variable pulse width where each

successive pulse is automatically increased or decreased (see fig. 2 and column 2, lines 18-20 and lines 35-36 of Malek-Khosravi). The reference in the Office Action to FIG. 2 of Malek-Khosravi as supporting the position that the signal tracks process corners is not technically correct. FIG. 2 of Malek-Khosravi illustrates various pulse sequences that are generated by the test module of Malek-Khosravi (see column 2, lines 35-36 of Malek-Khosravi). Furthermore, Malek-Khosravi is silent regarding a predetermined pulse width correlating with a probability of a physical failure in the integrated circuit occurring at a future time, as presently claimed. Therefore, the combination of Ahmad and Malek-Khosravi does not teach or suggest each and every element of the presently claimed invention. As such, the presently claimed invention is fully patentable over the cited references and the rejection should be withdrawn.

Furthermore, Malek-Khosravi appears to teach away from generating an internal control signal having a predetermined pulse width in response to a control input, as presently claimed. Specifically, Malek-Khosravi states that one of the problems with using available instruments called pulse generators to generate narrow width clock pulses as test signals for the clocked logic chips is that at any one time they merely generate pulses of a simple width. Therefore, since Malek-Khosravi teaches that merely generating pulses of a simple width provides a problem as far as

test signals for clocked logic chips, it follows that modification of Malek-Khosravi to provide a single pulse of predetermined width would render the invention of Malek-Khosravi unsatisfactory for its intended purpose. As such, there is no suggestion or motivation to make the proposed modification (see MPEP §2143.01 and *In re Gordon*, 221 USPQ 1125 (Fed.Cir. 1984)). Therefore, the Office Action fails to meet the Office's burden of factually establishing a *prima facia* case of obviousness (MPEP §2142). As such, the presently claimed invention is fully patentable over the combination of Ahmad and Malek-Khosravi and the rejection should be withdrawn.

Claims 2-10 and 13-24 depend either directly or indirectly from claims 1 and 12 which are believed to be fully patentable over the cited references. As such, the presently claimed invention is fully patentable over the cited references and the rejection should be withdrawn.

Accordingly, the present application is in condition for allowance. Early and favorable action by the Examiner is respectfully solicited.

The Examiner is respectfully invited to call the Applicants' representative should it be deemed beneficial to further advance prosecution of the application.



If any additional fees are due, please charge our office
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Respectfully submitted,

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